

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1-24 and 27-31 are pending in this application. Claims 25 and 26 have been canceled without prejudice or disclaimer. Claims 29-31 have been added and Claims 1, 27, and 28 have been amended without introducing any new matter. New Claims 29-31 are further believed to read on the elected species.

The outstanding Office Action includes objections to the drawings and Claims 26 and 28. It also includes a rejection of Claims 1 and 2 as being anticipated by Kuo et al (U.S. Patent No. 5,446,814, Kuo) under 35 U.S.C. §102(b), a rejection of Claims 25 and 26 as being anticipated by Bhagavatula (U.S. Patent No. 6,259,841) under 35 U.S.C. §102(e), a rejection of Claim 27 as being anticipated by Bazylenko et al (U.S. Patent No. 6,154,582, Bazylenko) under 35 U.S.C. §102(3), and a rejection of Claim 28 as being unpatentable over Bazylenko in view of Bhagavatula.

The objections to the drawing are believed to be moot in view of the attached sheets of drawings adding the “Prior Art” label to FIGS. 1 and 2 and deleting “n3” from FIG. 4.

In addition to the above-noted drawing changes, the objection to “31” as not shown has been corrected by changing “31” (at page 38, line 3) to --10B--. Also, the paragraph beginning at page 37, line 24, has been corrected to describe the deposited layer 3D shown in FIG. 10B. Similarly, the optical rod 12 is now discussed in the paragraph beginning at line 20 on page 39. Accordingly, the objections as to these reference signs are also believed to be moot.

The objection to Claim 26 is believed to be moot in view of the cancellation of this claim. The objection to Claim 28 is believed to be moot in view of the present Amendment that changes

“the optical unit” to --an optical unit--.

Before turning to the claim rejections, it is believed that a brief review of the present invention would be helpful. In this respect, the present invention is concerned with an optical interconnection circuit board having an optical circuit (optical module), which is configured with a core and clad layers and having electrical parts (forming a circuit) formed on the same substrate. In particular, a mirror segment and an electrical connecting pattern (wiring) are formed on a first clad layer on a common substrate. Such a structure enables the mirror segment to be provided with a function of electrically connecting elements and to be formed as part of the same process used for the electrical connecting pattern. As a result, the integration of the optical interconnection circuit board can be improved, thereby downsizing the board.

In a manufacturing method aspect of the invention, a mirror segment is formed on a clad layer by deposition or sputtering through a first and a second opening in a double-layered mask. The holes in the first and second mask layers can be widened toward the substrate, and the cross sections of the mirror segment can be formed with an approximately triangular or ridge shape. The mirror segment can be thus formed with high precision using two mask layers with apertures provided on each of the layers.

Turning to the rejection of Claims 1 and 2 as being anticipated by Kuo, it is noted that while Kuo does disclose a structure wherein a core 113 and reflective surfaces 117, 118 are embedded in an optical portion 111, it does not disclose forming mirror segments on a clad layer having flat surface. In addition, Kuo does not disclose or suggest further forming a circuit pattern on the same flat clad layer. In Kuo, the waveguide module comprises circuit components such as a bonding pad 137, electrical traces 131-136, and photonic devices 141. Kuo further

discloses adding electrical parts to an optical module after the optical module has been prepared. Thus, Kuo does not disclose or suggest a circuit board wherein the electrical parts are incorporated inside the optical module.

The rejection of Claims 1 and 2 is, thus, respectfully traversed.

The rejection of Claims 25 and 26 is believed to be moot as these claims have been canceled.

The rejections of Claim 27 as being anticipated by Bazylenko and Claim 28 as being obvious over Bazylenko in view of Bhagavatula are traversed.

Neither Bhagavatula nor Bazylenko disclose or suggest a technique of making a mirror module with high precision by using a double-layered mask as amended Claim 27 recites. Therefore, Claim 27 and Claim 28 dependent on Claim 27 are believed to define over these references, considered alone or together in any proper combination.

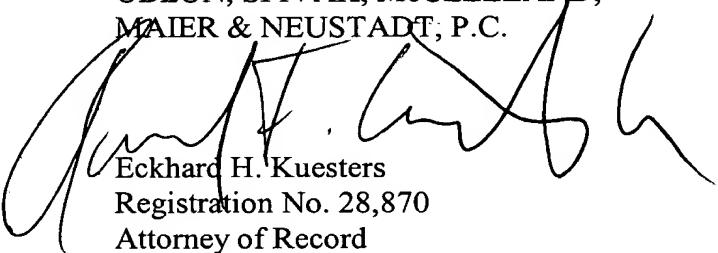
Furthermore, as new Claim 29 depends on Claim 1 and new Claims 30 and 31 depend on Claim 27, these claims are believed to define over the applied references for the same reasons as their parent claims as well as because of the additional features cited therein.

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Since no other issues are believed to remain outstanding relative to this application, it is believed to be clear that this application is in condition for formal allowance and an early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

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